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Converting Virginia Pine Stump Diameters To Diameters Breast High

Up until the last decade, practically no forest-management work had been done in stands of Virginia pine (Pinus virginiana Miller). It is still common practice to clear-cut the stand--with no consideration for a future crop. In some places this has resulted in satisfactory establishment of another pine stand. But usually hardwoods take over the site after two such cuttings.

In augmenting our knowledge about the management of Virginia pine, it is essential that we study how different cutting practices affect establishment of reproduction. To evaluate the quality and density of the reproduction, as well as the growth of former stands, we should know something of the stands' history.

Two of the important factors are basal area and volume. These data can be estimated for a cut-over stand by studying the stumps. But since most measurements are based on diameter breast high (d.b.h.), one must know how to estimate d.b.h. from stump diameter.

As an aid in doing this, stump-d.b.h. relationships were worked out for Virginia pine stands on the Beltsville Experimental Forest near Laurel, Maryland. They were based on 300 sample trees, ranging in d.b.h. from 1 to 19 inches and in age from 10 to 75 years.

Diameter measurements were made at breast height and at 6 inches and 1 foot above the ground. (Stump-d.b.h. relationships have usually been based on stump measurements 1 foot above the ground. But because of the trend toward lower stumps--due partly to increased use of power saws--the additional stump measurement was taken at 6 inches above the ground.)

From these measurements, curves were formulated to express the relationship between stump diameter and diameter breast high (fig. 1).

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These curves for Virginia pine were formulated from regression analyses of d.b.h. on stump diameter, in which X^1 = d.b.h. and y = stump diameter. First-degree curves of the form $X^1 = a + by$ were compared with second-degree curves of the form $X^1 = a + b_1y^2$. The same procedure was used for

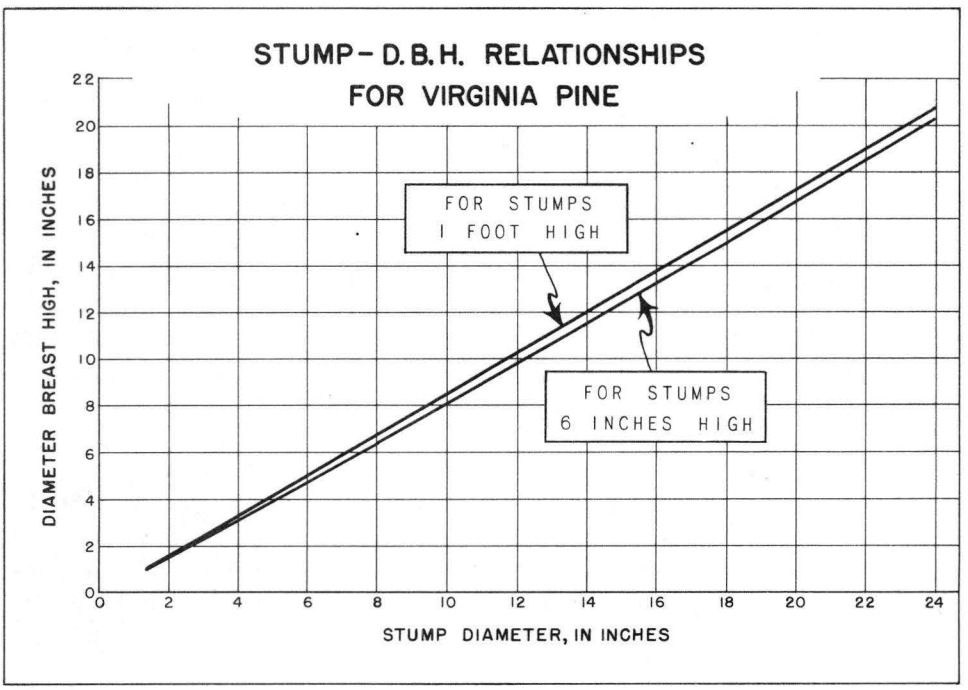

Figure 1.--The relationship between stump diameter and diameter breast high for Virginia pine at the Beltsville Experimental Forest in Maryland.

both stump heights. For 6-inch stump diameters the second-degree curve was significantly better (at the 5-percent level) than the first-degree curve. However, the first-degree curve gave the better fit for data from 1-foot stump diameters.

The applicability of these curves to stands outside the Beltsville Experimental Forest has not been tested yet.

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